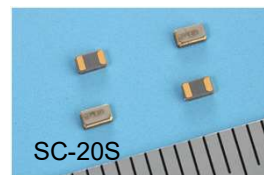
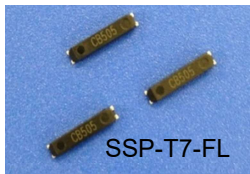
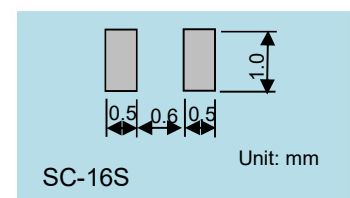
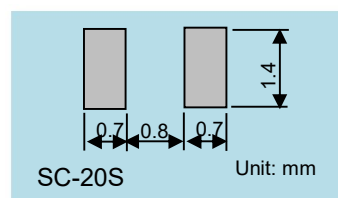
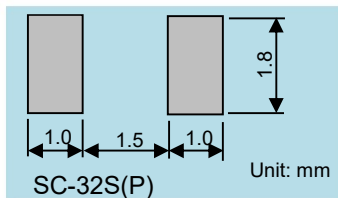
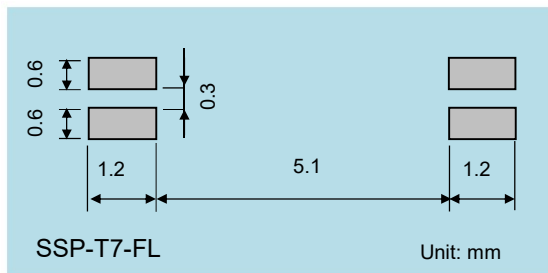


◆Specification for Quartz Crystal

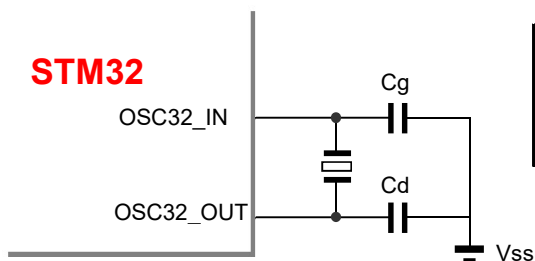
	SSP-T7-FL	SC-32P	SC-32S	SC-20S	SC-16S
Nominal Frequency	32.768kHz	32.768kHz	32.768kHz	32.768kHz	32.768kHz
Frequency Tolerance	$\pm 20 \times 10^{-6}$	$\pm 20 \times 10^{-6}$	$\pm 20 \times 10^{-6}$	$\pm 20 \times 10^{-6}$	$\pm 20 \times 10^{-6}$
Load capacitance: CL	4.4pF/6.0pF	6.0pF	12.5pF	12.5pF	12.5pF
Motional Resistance: R1	50kΩ/65kΩmax	50kΩmax	70kΩmax	70kΩmax	90kΩmax
Absolute Maximum Drive Level	1.0μW max	1.0μW max	1.0μW max	1.0μW max	0.5μW max
Dimensions (Thickness: Max. Value)	7.0×1.5×1.4mm	3.2×1.5×0.85mm	3.2×1.5×0.85mm	2.0×1.2×0.6mm	1.6×1.0×0.5mm



RECOMMENDED SOLDERING PATTERN



◆Qualification item for Oscillation circuit characteristics



No	Items	Symbol	Recommendation
1	Negative Resistance	RL	
2	Oscillation allowance	M	more than 5 times of R1Max.

Seiko Instruments Inc.

1-8, Nakase, Mihama-ku, Chiba-shi, Chiba 261-8507, Japan

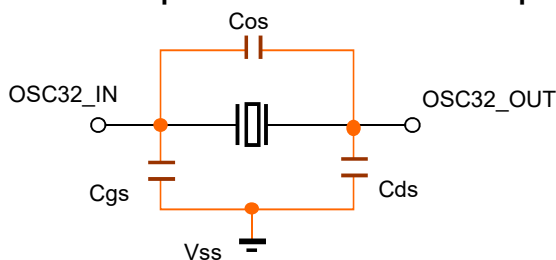
Facsimile : +81-43-211-8030

E-mail : component@sii.co.jp

◆Circuit matching constant for Oscillation circuit

STM32 series	32kHz Quartz Crystal			External condensor		Oscillation Characteristics		Supply Vdd (V)
	Product	R1Max. (kΩ)	CL (pF)	Cg (pF)	Cd (pF)	RL (kΩ)	M (Times)	
STM32L053 ※Lower driving capability	SC-32P	50	6	6	6	-294	6	3
	SSP-T7-FL	50	6	6	6	-267	5	
	SSP-T7-FL	65	4.4	3	4	-466	7	
STM32F401	SC-32P	50	6	6	5	-337	7	3
	SSP-T7-FL	50	6	5	5	-347	7	
	SSP-T7-FL	65	4.4	3	2	-506	8	
STM32F091 ※Higher Driving capability	SC-32S	70	12.5	15	15	-810	12	3
	SC-20S	70	12.5	15	16	-780	11	
	SC-16S	90	12.5	16	16	-780	9	
STM32F334 ※Higher Driving capability	SC-32S	70	12.5	15	15	-693	10	3
	SC-20S	70	12.5	15	12	-692	10	
	SC-16S	90	12.5	15	15	-736	8	

◆Approximate expression for Circuit load capacitance



$$CL = Cg \times Cd / (Cg + Cd) + Cs \text{ (pF)}$$

Cos : OSC32_IN-OSC32_OUT Stray capacitance

Cgs : OSC32_IN-Vss Stray capacitance

Cds : OSC32_OUT-Vss Stray capacitance

◆Notes

The above evaluation results are reference values evaluated in the specific sample and "Nucleo 64 Evaluation Board", and the contents are not guaranteed.

Please note that in the actual circuit board, the value of the external element capacitance and the characteristics may change depending on the difference in stray capacitance and so on.

◆Notes for the design of Circuit board

Please keep the wiring short and place Quartz Crystal, Condensor, and Resistance close as possible to STM microcontroller. In order to prevent interference with other signal lines, do not provide other signal lines, please do not provide other signal lines on the crystal mounting part (bottom surface).

